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FLOOD INSURANCE STUDY

VILLAGE OF ST. JOHNSVILLE, NEW YORK
MONTGOMERY COUNTY

SEPTEMBER 29, 1989

Federal Emergency Management Agency

COMMUNITY NUMBER 360457

NOTICE TO
FLCOD INSURANCE STUDY USERS

Communities participating in the National Flood Insurance Program (NFIP) have established repositories of flood hazard data for floodplain management and flood insurance purposes. This Flood Insurance Study (FIS) may not contain all data available within the repository. It is advisable to contact the community repository for any additional data.

Part or all of this FIS may be revised and republished at any time. In addition, part of this FIS may be revised by the Letter of Map Revision (LOMR) process, which does not involve republication or redistribution of the FIS. It is, therefore, the responsibility of the user to consult with community officials and to check the community repository to obtain the most current FIS components.

Initial Flood Insurance Study Effective Date: February 19, 1986

Flood Insurance Study Revised: September 29, 1989

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FLOOD INSURANCE STUDY
VILLAGE OF ST. JOHNSVILLE, MONTGOMERY COUNTY, NEW YORK

1.0 INTRODUCTION

1.1 Purpose of Study

This Flood Insurance Study revises and updates a previous Flood Insurance Study/Flood Insurance Rate Map for the Village of St. Johnsville, Montgomery County, New York. This information will be used by the Village of St. Johnsville to update existing floodplain regulations as part of the Regular Phase of the National Flood Insurance Program (NFIP). The information will also be used by local and regional planners to further promote sound land use and floodplain development.

In some states or communities, floodplain management criteria or regulations may exist that are more restrictive or comprehensive than the minimum Federal requirements. In such cases, the more restrictive criteria take precedence and the state (or other jurisdictional agency) will be able to explain them.

1.2 Authority and Acknowledgments

The sources of authority for this Flood Insurance Study are the National Flood Insurance Act of 1968 and the Flood Disaster Protection Act of 1973.

The hydrologic and hydraulic analyses in this study were prepared by Edwards and Kelsey during the preparation of the Flood Insurance Study for the Town of St. Johnsville. The work for that study was completed in September 1981.

1.3 Coordination

On April 11, 1988, the Village of St. Johnsville was notified by FEMA of the initiation of an update to the Flood Insurance Study for the village.

On August 18, 1988, a final CCO meeting was held with representatives of FEMA and the village to review the results of the study.

2.0 AREA STUDIED

2.1 Scope of Study

This Flood Insurance Study covers the incorporated area of the Village of St. Johnsville, Montgomery County, New York. The area of study is shown on the Vicinity Map (Figure 1).

The Mohawk River was studied by detailed methods for its entire length affecting the community. The areas studied by detailed methods were selected with priority given to all known flood hazard areas and areas of projected development and proposed construction.

Zimmerman Creek, within the town corporate limits, was studied by approximate methods. Approximate analyses were used to study those areas having a low development potential or minimal flood hazards. The scope and methods of study were proposed to, and agreed upon by, FEMA and the Village of St. Johnsville.

2.2 Community Description

The Village of St. Johnsville is located in the western portion of Montgomery County in the east-central region of New York. St. Johnsville is bordered on the east, west, and north by the Town of St. Johnsville; and on the south, across the Mohawk River, by the Town of Minden.

The climate in central New York is characteristically humid continental. Summer and winter temperature extremes in the area have ranged from -36 degrees Fahrenheit (^{o}F) at the Village of Salisbury, located 12 miles northwest of St. Johnsville, to 102^{o}F at the Village of Sharon Springs, located 15 miles south of St. Johnsville (Reference 1). The distribution of precipitation is fairly uniform throughout the year with a mean annual precipitation of approximately 39.8 inches (Reference 2).

Commercial and residential concentrations are generally located within the incorporated Village of St. Johnsville.

The Mohawk River, which flows southeast along the southern boundary of the Village, is the largest tributary to the Hudson River. Originating in Lewis County, this waterway flows southeast, to Cohoes, New York, with a total length of 155 miles. Its watershed encompasses 3,462 square miles and is best characterized by its lake and woodland regions north of the river, and rich agricultural land to the south. Major tributaries to the Mohawk River are Caroga Creek, East Canada Creek, and West Canada Creek flowing from the north, and Schoharie Creek flowing from the south. Since the late 1800s, portions of the Mohawk River have been incorporated into the Erie Canal System. These navigable waters extend from the Great Lakes to the Hudson River by a series of land cut canals, river sections, and locks.

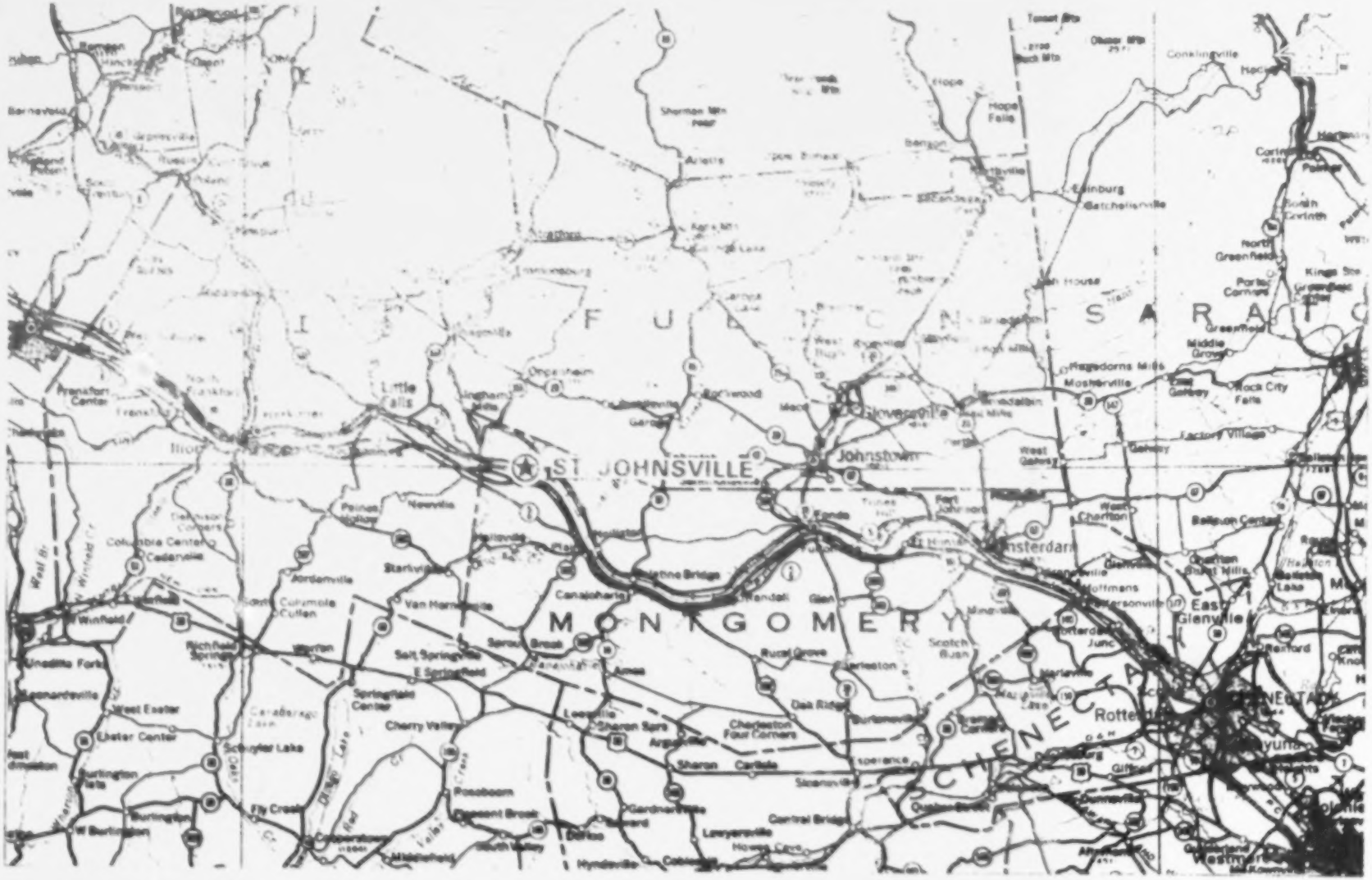


FIGURE 1

FEDERAL EMERGENCY MANAGEMENT AGENCY

VILLAGE OF ST. JOHNSVILLE, NY

(MONTGOMERY CO.)

APPROXIMATE SCALE

8 0 8 16 24 MILES

VICINITY MAP

2.3 Principal Flood Problems

The past history of flooding on streams in St. Johnsville indicates that flooding typically occurs in the late winter and early spring months. Flooding during this portion of the year is usually a result of ice blockages accompanied by the spring rainfall and snowmelt. Flooding may also occur during the late summer months as a result of tropical storms tracking northward along the Atlantic coastline, or due to regional thunderstorm activity.

These periods of heavy rainfall during late summer have produced two of the worst floods on record in the Mohawk Valley. On September 22, 1938, and October 2, 1945, the Mohawk River overtopped its banks and inundated the low-lying area of St. Johnsville. Floodwater covered the farmland located east and west of the Village of St. Johnsville to a depth of several feet. These areas flood annually as a result of backwater from ice blockages in the Mohawk River and East Canada Creek. The peak discharge experienced during the September 22, 1938 flood was record as 22,700 cubic feet per second (cfs), at the USGS gage (No. 1-3470) located approximately 1,800 feet downstream of Rocky Rift Dam, near the City of Little Falls (Reference 3). The district office for the Division of Canals and Waterways [illegible] peak water-surface elevation for this flood as 311.8 feet at Lock 16. The peak-discharge associated with the October 2, 1945 flood was recorded as 25,300 cfs at the same USGS gage near Rocky Rift Dam [illegible]. The corresponding peak water-surface was reported to be 313.3 feet at Lock 16.

Figures 2 and 3 show flooding experienced along the Mohawk River during the September 22, 1938 flood.

Figure 2 - View of flooding along the Mohawk River, looking downstream from Lock 16 at Minden, during the September 22, 1938 flood.

Figure 3 - View of flooding along the Mohawk River, looking upstream from State Route 5 approximately 1.5 miles east of the Village of St. Johnsville, during the September 22, 1938 flood.

2.4 Flood Protection Measures

Currently, there are no flood protection facilities along the Mohawk River affecting the Village of St. Johnsville.

3.0 ENGINEERING METHODS

For the flooding source studied in detail in the community, standard hydrologic and hydraulic study methods were used to determine the flood hazard data required for this study. Flood events of a magnitude which are expected to be equaled or exceeded once on the average during any 10-, 50-, 100-, or 500-year period (recurrence interval) have been selected as having special significance for floodplain management and for flood insurance rates. These events, commonly termed the 10-, 50-, 100-, and 500-year floods, have a 10, 2, 1, and 0.2 percent chance, respectively, of being equaled or exceeded during any year. Although the recurrence interval represents the long term average period between floods of a specific magnitude, rare floods could occur at short intervals or even within the same year. The risk of experiencing a rare flood increases when periods greater than 1 year are considered. For example, the risk of having a flood which equals or exceeds the 100-year flood (1 percent chance of annual exceedence) in any 50-year period is approximately 40 percent (4 in 10), and, for any 90-year period, the risk increases to approximately 60 percent (6 in 10). The analyses reported herein reflect flooding potentials based on conditions existing in the community at the time of completion of this study. Maps and flood elevations will be amended periodically to reflect future changes.

3.1 Hydrologic Analyses

Hydrologic analyses were carried out to establish the peak discharge-frequency relationships for the flooding source studied in detail affecting the community.

Hydrology for the detailed study of the Mohawk River was based on previous studies conducted by the COE and the USGS at the long-term stream flow gages near Little Falls (No. 1-3470) and at Cohoes (No. 1-3575), respectively. The period of record for these gages, which are still in operation, is continuous from 1927 for gage No. 1-3470 and from 1918 for gage No. 1-3575. The COE analysis for gage No. 1-3470 was adjusted by the COE to conform with the procedures of the regional frequency technique developed by the COE (Reference 4) yielding a 100-year frequency discharge of 38,525 cfs. The USGS analysis of gage 1-3575 utilized the Weibull plotting technique yielding a 100-year frequency discharge of 160,000 cfs. The necessary hydrology for the Mohawk River in St. Johnsville was subsequently developed using these gages as references and transferring the discharges to the study location by relative drainage area ratios using the equation:

$$\frac{Qu}{Qg} = \left(\frac{Au}{Ag}\right)^{n}$$

where Qu and Qg are the discharges at the desired ungaged site and the gaged site, respectively; Au and Ag are the drainage areas at these points; and n is an empirical variable used to correlate data between gaged basins. This procedure was utilized to provide consistency with previous or current studies which also use these gages as a reference.

A summary of the drainage area-peak discharge relationships for the Mohawk River is shown in Table 1, "Summary of Discharges."

TABLE 1 - SUMMARY OF DISCHARGES

FLOODING SOURCE AND LOCATION	DRAINAGE AREA (sq. miles)	PEAK DISCHARGES (cfs) 10-YEAR	50-YEAR	100-YEAR	500-YEAR
MOHAWK RIVER					
At NYDOT Lock 18	1,719	39,190	50,925	55,660	65,060

3.2 Hydraulic Analyses

Analyses of the hydraulic characteristics of flooding from the source studied were carried out to provide estimates of the elevations of flooding for the selected recurrence intervals.

The hydraulic analysis in this study was taken from the Flood Insurance Study for the Town of St. Johnsville (Reference 5).

For the Mohawk River, water-surface elevations of floods of selected recurence intervals were computed using the COE HEC-2 step-backwater computer program (Reference 6). All hydraulic computations relative to the New York State Barge Canal movable dams were performed considering open-channel flow conditions. It was assumed that the dam gates were in the stored, or non-navigable position. The HEC-2 computer model for the Mohawk River was calibrated using high-water marks produced by the March 27, 1970 discharge. Selection of this discharge was based on the confidence that the floodmarks would accurately approximate an open-channel flow condition. The natural (ice blockages), or man-made (NYDOT dams) restrictions frequently encountered during the periods of peak flows were not present at this time. Floodmarks for the Mohawk River were obtained from the gages located at each NYDOT navigation lock. When necessary, these floodmarks were transferred linearly between gages to selected sites within the reach.

Cross sections for the backwater analyses of the Mohawk River were obtained from aerial photographs flown in December 1979, at a scale of 1:9,600 (Reference 7). The topographic maps, at a scale of 1:4,800, prepared from the aerial photographs contain contours at 5-foot intervals. The below-water sections, bridge, dam, and culvert geometrics were obtained by field measurement. Cross sections were specified at intervals which would accurately model the stream according to the computer program input requirements. No cross sections were available for the portions of the Mohawk River affecting the Village of St. Johnsville.

Flood profiles were drawn showing computed water-surface elevations to an accuracy of 0.5 foot for floods of the selected recurrence intervals. Locations of selected cross sections used in the hydraulic analyses are shown on the Flood Profiles (Exhibit 1). For stream segments for which a floodway was computed (Section 4.2), selected cross-section locations are also shown on the Flood Insurance Rate Map (Exhibit 2).

Channel and overbank roughness factors (Manning's "n") used in the hydraulic computations were developed using reference material from Roughness Characteristics of Natural Channels, engineering judgment, and field observation of the stream and floodplain areas (Reference 8). Two roughness coefficients were used for the main channel of the Mohawk River. The primary value of 0.033 was used exclusively in areas where the overbanks were heavily overgrown or the channel showed significant deposits of gravel or cobbles. An alternate value of 0.030 was used in the remaining cleared areas and at bridges or dams where the channel becomes more efficient. Overbank roughness coefficients ranged from 0.045 for farmland to 0.085 for wooded regions. Extremely large roughness coefficients, typically between 0.3 and 3.0, were used in areas of ineffective flow. These regions include low-lying areas where floodwaters may become trapped by a topographic feature, or areas of building concentration.

Starting water-surface elevations for the Mohawk River were obtained from the Flood Insurance Study for the Town of St. Johnsville (Reference 5). All elevations used in this study are referenced to the National Geodetic Vertical Datum of 1929 (NGVD), formerly referred to as Sea Level Datum of 1929.

The hydraulic analyses for this study were based on unobstructed flow. The flood elevations shown on the profiles are thus considered valid only if hydraulic structures remain unobstructed, operate properly, and do not fail.

4.0 FLOODPLAIN MANAGEMENT APPLICATIONS

The NFIP encourages State and local governments to adopt sound floodplain management programs. Therefore, each Flood Insurance Study provides 100-year flood elevations and delineations of the 100- and 500-year floodplain boundaries and 100-year floodway to assist in developing floodplain management measures.

4.1 Floodplain Boundaries

To provide a national standard without regional discrimination, the 1 percent annual chance (100-year) flood has been adopted by FEMA as the base flood for floodplain management purposes. The 0.2 percent annual chance (500-year) flood is employed to indicate additional areas of flood risk in the community. For the flooding source studied in detail, the 100- and 500-year floodplain boundaries have been delineated using topographic maps at a scale of 1:4,800 with a contour interval of 5 feet (Reference 7).

For the portion of Zimmerman Creek studied by approximate methods, the 100-year floodplain boundary was delineated using the previous Flood Insurance Study for the Village of St. Johnsville (Reference 9).

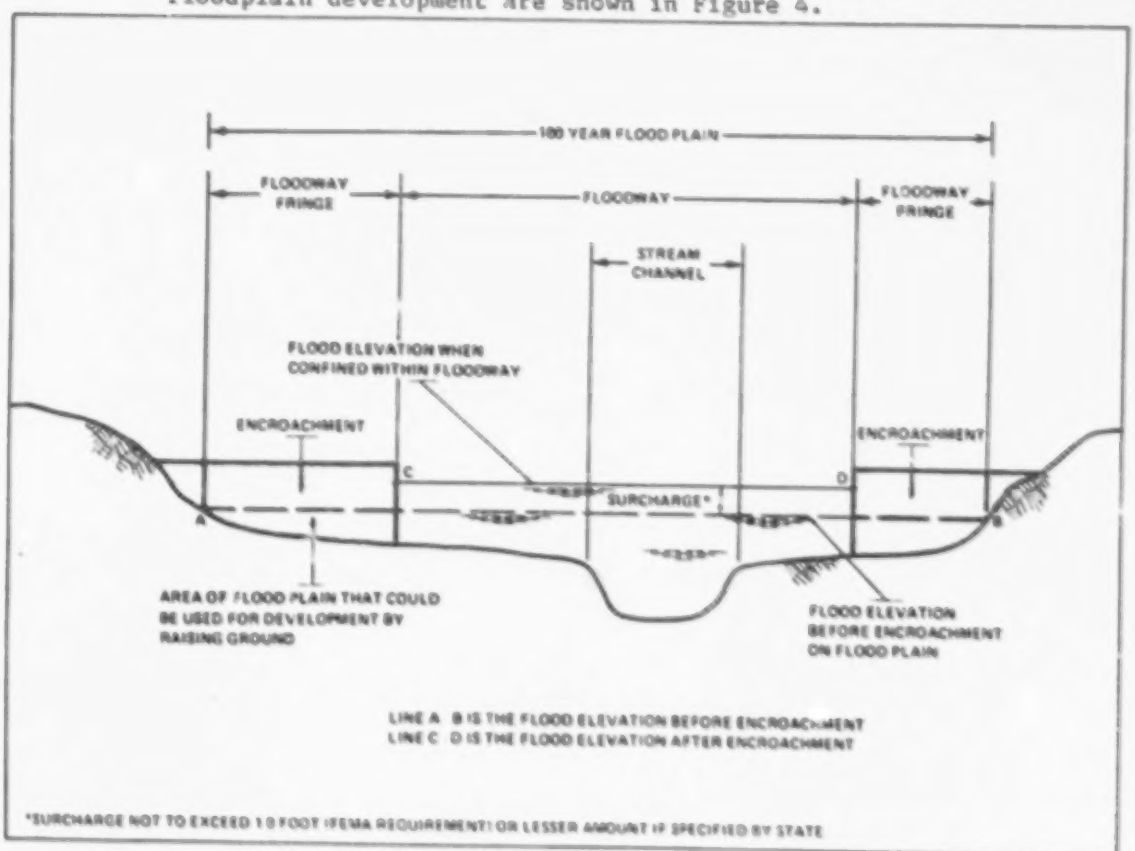
The 100- and 500-year floodplain boundaries are shown on the Flood Insurance Rate Map (Exhibit 2). On this map, the 100-year floodplain boundary corresponds to the boundary of the areas of special flood hazards (Zones A and AE), and the 500-year floodplain boundary corresponds to the boundary of areas of moderate flood hazards. In cases where the 100- and 500-year floodplain boundaries are close together, only the 100-year floodplain boundary has been shown. Small areas within the floodplain boundaries may lie above the flood elevations but cannot be shown due to limitations of the map scale and/or lack of detailed topographic data.

4.2 Floodways

Encroachment on floodplains, such as structures and fill, reduces flood-carrying capacity, increases flood heights and velocities, and

increases flood hazards in areas beyond the encroachment itself. One aspect of floodplain management involves balancing the economic gain from floodplain development against the resulting increase in flood hazard. For purposes of the National Flood Insurance Program, a floodway is used as a tool to assist local communities in this aspect of floodplain management. Under this concept, the area of the 100-year floodplain is divided into a floodway and a floodway fringe. The floodway is the channel of a stream, plus any adjacent floodplain areas, that must be kept free of encroachment so that the 100-year flood can be carried without substantial increases in flood heights. Minimum federal standards limit such increases to 1.0 foot, provided that hazardous velocities are not produced. The floodway in this study is presented to local agencies as a minimum standard that can be adopted directly or that can be used as a basis for additional floodway studies.

The area between the floodway and 100-year floodplain boundaries is termed the floodway fringe. The floodway fringe encompasses the portion of the floodplain that could be completely obstructed without increasing the water-surface elevation of the 100-year flood by more than 1.0 foot at any point. Typical relationships between the floodway and the floodway fringe and their significance to floodplain development are shown in Figure 4.


100 YEAR FLOOD PLAIN
FLOODWAY FRINGE
FLOODWAY
FLOODWAY FRINGE
STREAM CHANNEL
FLOOD ELEVATION WHEN CONFINED WITHIN FLOODWAY
ENCROACHMENT
ENCROACHMENT
C
D
SURCHARGE*
A
B
AREA OF FLOOD PLAIN THAT COULD BE USED FOR DEVELOPMENT BY RAISING GROUND
FLOOD ELEVATION BEFORE ENCROACHMENT ON FLOOD PLAIN
LINE A B IS THE FLOOD ELEVATION BEFORE ENCROACHMENT
LINE C D IS THE FLOOD ELEVATION AFTER ENCROACHMENT
*SURCHARGE NOT TO EXCEED 1.0 FOOT (FEMA REQUIREMENT) OR LESSER AMOUNT IF SPECIFIED BY STATE

Floodway Schematic

Figure 4

5.0 INSURANCE APPLICATIONS

For flood insurance rating purposes, flood insurance zone designations are assigned to a community based on the results of the engineering analyses. The zones are as follows:

Zone A

Zone A is the flood insurance rate zone that corresponds to the 100-year floodplains that are determined in the Flood Insurance Study by approximate methods. Because detailed hydraulic analyses are not performed for such areas, no base flood elevations or depths are shown within this zone.

Zone AE

Zone AE is the flood insurance rate zone that corresponds to the 100-year floodplains that are determined in the Flood Insurance Study by detailed methods. In most instances, whole-foot base flood elevations derived from the detailed hydraulic analyses are shown at selected intervals within this zone.

Zone AH

Zone AH is the flood insurance rate zone that corresponds to the areas of 100-year shallow flooding (usually areas of ponding) where average depths are between 1 and 3 feet. Whole-foot base flood elevations derived from the detailed hydraulic analyses are shown at selected intervals within this zone.

Zone AO

Zone AO is the flood insurance rate zone that corresponds to the areas of 100-year shallow flooding (usually sheet flow on sloping terrain) where average depths are between 1 and 3 feet. Average whole-depths derived from the detailed hydraulic analyses are shown within this zone.

Zone A99

Zone A99 is the flood insurance rate zone that corresponds to areas of the 100-year floodplain that will be protected by a Federal flood protection system where construction has reached specified statutory milestones. No base flood elevations or depths are shown within this zone.

Zone V

Zone V is the flood insurance rate zone that corresponds to the 100-year coastal floodplains that have additional hazards associated with storm waves. Because approximate hydraulic analyses are performed for such areas, no base flood elevations are shown within this zone.

Zone VE

Zone VE is the flood insurance rate zone that corresponds to the 100-year coastal floodplains that have additional hazards associated with storm waves. Whole-foot base flood elevations derived from the detailed hydraulic analyses are shown at selected intervals within this zone.

Zone X

Zone X is the flood insurance rate zone that corresponds to areas outside the 500-year floodplain, areas within the 500-year floodplain, and to areas of 100-year flooding where average depths are less than 1 foot, areas of 100-year flooding where the contributing drainage area is less than 1 square mile, and areas protected from the 100-year flood by levees. No base flood elevations or depths are shown within this zone.

Zone D

Zone D is the flood insurance rate zone that corresponds to unstudied areas where flood hazards are undetermined, but possible.

6.0 FLOOD INSURANCE RATE MAP

The Flood Insurance Rate Map is designed for flood insurance and floodplain management applications.

For flood insurance applications, the map designates flood insurance rate zones as described in Section 5.0 and, in the 100-year floodplains that were studied by detailed methods, shows selected whole-foot base flood elevations or average depths. Insurance agents use the zones and base flood elevations in conjunction with information on structures and their contents to assign premium rates for flood insurance policies.

For floodplain management applications, the map shows by tints, screens, and symbols, the 100- and 500-year floodplains. Floodways and the locations of selected cross sections used in the hydraulic analyses and floodway computations are shown where applicable.

7.0 OTHER STUDIES

A Flood Insurance Study has been prepared for the Town of St. Johnsville (Reference 5). The results of this study are in agreement with the results of that study.

Due to its more up-to-date nature, this study supersedes the previous Flood Insurance Study for the Village of St. Johnsville (Reference 9).

8.0 LOCATION OF DATA

Information concerning the pertinent data used in preparation of this study can be obtained by contacting FEMA, the Natural and Technological Hazards Division, 26 Federal Plaza, Room 1351, New York, New York 10278.

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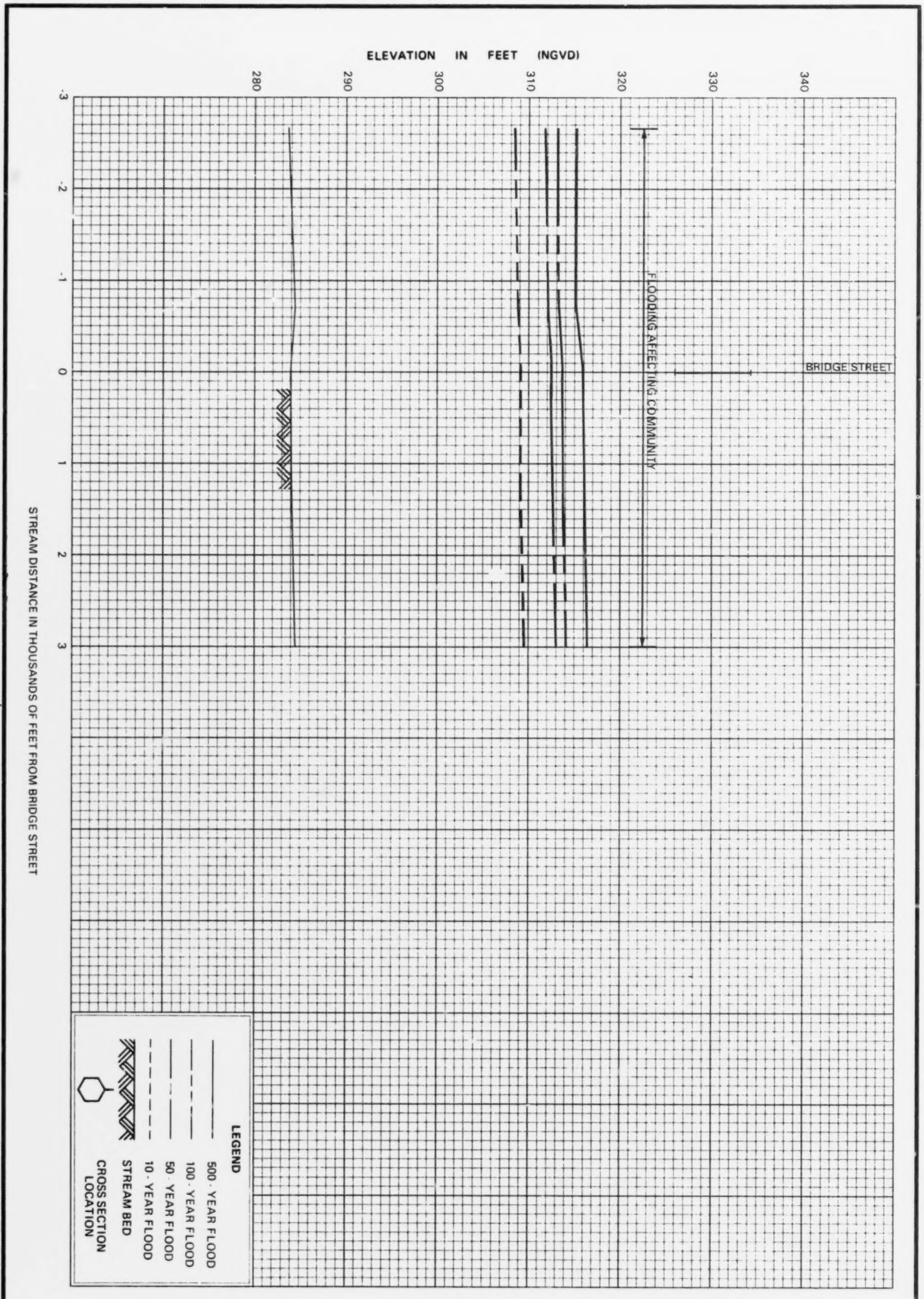

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FEDERAL EMERGENCY MANAGEMENT AGENCY

VILLAGE OF ST. JOHNSVILLE, NY

(MONTGOMERY CO.)

FLOOD PROFILES

MOHAWK RIVER